

Chemistry I Final Exam Review 2015

The final exam will consist of questions from the following units:

Moles and Stoichiometry, States of Matter (KMT), Behavior of Gases, Solutions, Acids and Redox Reactions

Mole Conversions and Stoichiometry:

- Determine the number of liters in 1 mole of any gas at STP
- Determine the number of atoms in 1 mole of any substance
- Determine the number of grams in 1 mole of any substance
- Describe the importance of a mole ratio
- Complete one and two step conversions using volume, mass, moles, and atoms (one-step as well as multi-step conversions)
- Given the mass or volume of one component of a chemical reaction, solve for the mass or volume of a second component
- Complete percent yield calculations using the equation below:

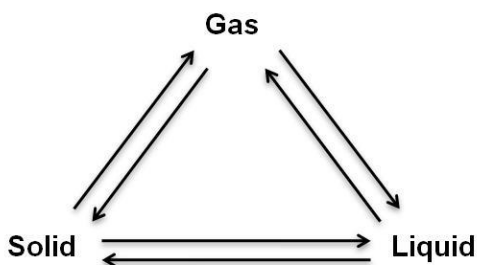
States of Matter:

- Describe the five points of the Kinetic Molecular Theory and how they relate to solids, liquids, and gases
- Compare and contrast solids, liquids, and gases in terms of energy, motion, density, shape, volume and compressibility
- Identify all six phase changes and describe what is happening during each change in terms of heat and energy of particles
- Compare and contrast the four types of intermolecular forces (IMF's) in terms of strength and where they are found
- Complete the following table

	Solid	Liquid	Gas
Definite volume? (Y/N)			
Fluid? (Y/N)			
Compressible? (Y/N)			
Attractive forces between molecules (strong/medium/none)			
Speed of molecules			

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- Water boils at 100 °C while methane (CH₄) boils at -161 °C. Both have similar masses. Explain using KMT why water boils at a higher temperature.
- Where will water boil at a higher temperature – Mount Everest or New Orleans? Explain.
- Label the following diagram using the following terms: **melting, freezing, sublime, deposition, condense, & vaporize**



- Determine the relationship between atmospheric pressure and boiling point
- Define equilibrium, explain under what conditions can it exist, and the processes that are taking place when it does exist
- What does the term dynamic equilibrium mean? Which system is at dynamic equilibrium – a closed water bottle or an open one?

Gases and Their Properties:

- Define STP
- Convert between degree Celsius and Kelvin
- Solve all gas law problems (Boyle, Charles, Guy Lussac, Combined, Ideal)

Solutions:

- Define solute and solvent and differentiate between the two
- Determine which substances will dissolve the fastest (or slowest)
- Describe the various ways to increase the dissolution of a solid in water
- Describe the relationship between temperature and the solubility of gases in water
- Describe the relationship between temperature and the solubility of solids in water
- Differentiate between an electrolyte and non-electrolyte solution
- Determine what substances will dissolve in each other (relate to terms of polarity)
- Calculate the following:
 - Molarity
 - Molality
 - Weight by percent
 - Dilution
- Answer questions using a solubility chart

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- Describe how certain solutes will affect the freezing and boiling points of a solvent
- Calculate the freezing and boiling points of solutions

Acids and Bases:

- List the properties of acids and bases
- Describe Arrhenius acids and bases
- Describe Brønsted-Lowry acids and bases
- Differentiate between conjugate acid and conjugate base
- Determine the conjugate acid-base pairs in a chemical reaction
- List the six strong acids and seven strong bases (both names and formulas)
- Differentiate between monoprotic, diprotic, and triprotic
- Calculate pH, pOH, $[H^+]$, and $[OH^-]$ using the given equations
- Determine if a substance is acidic or basic based on its respective pH, pOH, $[H^+]$, or $[OH^-]$
- Describe how the pH scale compares the acidity of any two substances, given their respective pH values
- Determine the products of a neutralization reaction, and solve titration problems
- How can you identify an Arrhenius acid from its formula? An Arrhenius base?

Redox Reactions:

- Assign correct oxidation numbers (charges)
- Define oxidation and reduction
- Identify the oxidation and reduction half reactions

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Additional Notes and review Items: